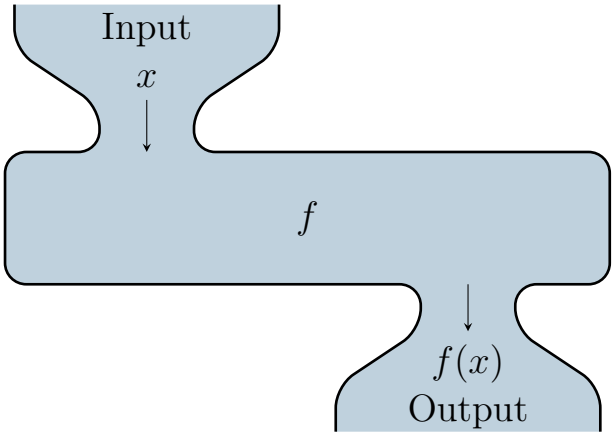
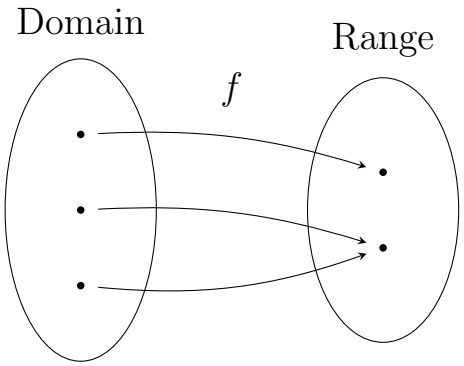
2.1: Functions and Their Graphs

Definition.
A **function** is a rule that assigns to each element in a set A one and only one element in a set B.
In the context above, the set A is called the **domain**, and the set B is called the **range**.





Example. Let $f(x) = 2x^2 - 2x + 1$. Evaluate the following

$f(1)$ $f(-2)$

$f(a)$ $f(a+h)$

Example. Find the domain and range of the following functions:

$f(x) = x$

$A = \pi r^2$

$y = \sqrt{x-1}$

$y = \dfrac{1}{x^2-4}$

Definition. (Vertical Line Test)
A curve in the xy-plane is the graph of a function $y = f(x)$ (an explicit function) if and only if each vertical line intersects it in at most one point

Example. Use the vertical line test on the following graphs to determine which graphs may represent an explicit function: